CLAIMS

What is claimed is:

1   1. A data communications network, comprising:

2   an end station;

3   a data communications ring configured for spatial reuse; and

4   first and second bridges coupled to the ring, the first

5   bridge also being coupled to the end station, wherein the second

6   bridge is operative (1) to learn an association between the first

7   bridge and the end station, and (2) upon receiving a packet

8   destined for the end station: (i) to forward the received packet

9   as a broadcast transmission on the ring in the event that the

10   association between the first bridge and the end station has not

11   yet been learned, and (ii) to forward the received packet as a

12   unicast transmission to the first bridge on the ring in the event

13   that the association between the first bridge and the end station

14   has been learned.

1   2. A data communications network according to claim 1, wherein the

2   end station comprises an interworking bridge.

1   3. A data communications network according to claim 2, wherein the

2   interworking bridge provides transparent LAN services via the ring

3   to customers connected to external LAN segments.

1   4. A data communications network according to claim 1, wherein the

2   ring is a resilient packet ring.

1   5. A data communications network according to claim 1, wherein the

2   ring is a first ring, and further comprising a second ring, the

3   second ring coupling the first bridge to the end station.

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6. A data communications network according to claim 1, wherein the end station is a first end station, and further comprising a second end station, the second end station being coupled to the second bridge, and wherein the first bridge is operative (1) to learn an association between the second bridge and the second end station, and (2) upon receiving a packet destined for the second end station: (i) to forward the received packet as a broadcast transmission on the ring in the event that the association between the second bridge and the second end station has not yet been learned, and (ii) to forward the received packet as a unicast transmission to the second bridge on the ring in the event that the association between the second bridge and the second end station has been learned.

7. A data communications network according to claim 6, wherein the first bridge learns the association between the second bridge and the second end station by monitoring a broadcast transmission of the second bridge on the ring, the broadcast transmission including an identifier of the second bridge as an ingress bridge and an address of the second end station as a source of a message included in the transmission.

8. A data communications network according to claim 6, wherein the ring is a first data communications ring, and further comprising (i) a second data communications ring configured for spatial reuse, the second ring coupling the second bridge to the second end station, and (ii) a third bridge, the third bridge being coupled to both the first and second rings as a backup to the second bridge, and wherein the second bridge is operative to send unicast update messages to the third bridge enabling the third bridge to keep track of the associations learned by the second bridge, and wherein the third bridge is operative upon failure of the second bridge to begin the learning of associations and the

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12 forwarding of packets on the first ring as broadcast or unicast

13 transmissions depending on whether respective associations have

14 been learned.

1 9. A method of operating a data communications network having an

2 end station, a data communications ring configured for spatial

3 reuse, and first and second bridges coupled to the ring, the first

4 bridge being coupled to the edge device, comprising:

5 at the second bridge, learning an association between the

6 first bridge and the end station; and

7 at the second bridge, upon receiving a packet destined for

8 the end station: (i) forwarding the received packet as a broadcast

9 transmission on the ring in the event that the association between

10 the first bridge and the end station has not yet been learned, and

11 (ii) forwarding the received packet as a unicast transmission to

12 the first bridge on the ring in the event that the association

13 between the first bridge and the end station has been learned.

1 10. A method according to claim 9, wherein the end station

2 comprises an interworking bridge.

1 11. A method according to claim 10, wherein the interworking

2 bridge provides transparent LAN services via the ring to customers

3 connected to external LAN segments.

1 12. A method according to claim 9, wherein the ring is a resilient

2 packet ring.

1 13. A method according to claim 9, wherein the ring is a first

2 ring, and wherein the network further comprises a second ring, the

3 second ring coupling the first bridge to the end station.

14. A method according to claim 9, wherein the end station is a first end station, and wherein the network further includes a second end station, the second end station being coupled to the second bridge, and further comprising:

    at the first bridge, learning an association between the second bridge and the second end station; and

    at the first bridge, upon receiving a packet destined for the second end station: (i) forwarding the received packet as a broadcast transmission on the ring in the event that the association between the second bridge and the second end station has not yet been learned, and (ii) forwarding the received packet as a unicast transmission to the second bridge on the ring in the event that the association between the second bridge and the second end station has been learned.

15. A method according to claim 14, wherein the first bridge learns the association between the second bridge and the second end station by monitoring a broadcast transmission of the second bridge on the ring, the broadcast transmission including an identifier of the second bridge as an ingress bridge and an address of the second end station as a source of a message included in the broadcast transmission.

16. A method according to claim 14, wherein the ring is a first data communications ring, and wherein the network further comprises a second data communications ring configured for spatial reuse, the second ring coupling the second bridge to the second end station, and a third bridge, the third bridge being coupled to both the first and second rings as a backup to the second bridge, and further comprising:

    at the second bridge, sending unicast update messages to the third bridge enabling the third bridge to keep track of the associations learned by the second bridge; and

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11   at the third bridge, upon failure of the second bridge,

12   beginning the learning of associations and the forwarding of

13   packets on the first ring as broadcast or unicast transmissions

14   depending on whether respective associations have been learned.

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